It is, then, by such a scheme as is here outlined that the scientific army of the nation can be marshalled to meet the present national emergency, but there is yet another aspect which will require immediate attention if we are to carry on the work without unnecessary hindrance.

One of the chief differences between the German and English patent laws is that while in this country a patent specification is held to be addressed to a person skilled in the art, say, to a skilled workman, in Germany it is sufficient if it is understood by an expert. This factor, apart from any intention to deceive on the part of the patentee, is responsible for the frequent "insufficiency of patent specification" which characterises both German patent specifications, as well as British specifications based upon German inventions. It is, indeed, very rare to have a German patent granted on the full text of the specification which was originally submitted to the German Patent Office. The outcome of this is that when the invention has been found novel and patentable by the examiner, the specification is promptly cut down and stripped of all such matter as he considers to be more or less obvious to an expert.

Again, the high cost of legal procedure in this country, and the fact that the Comptroller has no power to refuse the grant of a British patent for alleged insufficiency or want of subject matter, are responsible for the obtaining, particularly on the part of large German chemical companies, of a great number of "block" patents, the whole object of which is to block the development of chemical industry in this country.

It is certain that a good many chemists and chemical manufacturers are fully aware of the fact that a large number of British patents granted to Germans are merely "bluff," and could readily be invalidated were it not for the exceeding high cost connected in this country with such legal procedure; it is for this reason, also, that many small inventors stand absolutely no chance against large companies, which, in view of the high cost, are alone able to go before the Court.

Under Section 27 of the Patent Act an effort has been made to enforce the manufacture of patented inventions in this country by what is generally known as the "compulsory working" clause. It seems to be now admitted that this arrangement has not worked in practice, and its failure is due mainly to the lack of organisation, in this country, of the scientific ability which is vital to all modern industries.

In conclusion, I should add that I am indebted to Mr. J. E. Pollak, of the firm of Messrs. Dicker, Pollak, and Derrimann for the above information respecting the working of the patent laws.

JOCELYN THORPE.

NOTES.

WE regret to see the announcement of the death on January 24, at seventy-six years of age, of the astronomer, Prof. G. F. J. Arthur Auwers, of Berlin, foreign member of the Royal Society and associate of the Royal Astronomical Society.

DR. T. WESLEY MILLS, emeritus professor of physiology, McGill University, Montreal, died suddenly in London on February 14.

THE council of the British Medical Association has decided that the annual meeting, which was to have been held at Cambridge this summer, shall not take place. The statutory annual general meeting of the association, and the annual meeting of representatives will, however, be held.

GOOD progress is being made, says the *Pioneer Mail*, with the scheme for the establishment of a School of Tropical Medicine in Calcutta, with which the name of Sir Leonard Rogers is associated. An excellent site has been secured close to the Calcutta Medical College, and the buildings are in course of erection. The first subscription list shows that a lakh and three-quarter rupees has been obtained already, and another half-lakh is practically secure.

M. LOUIS MOISSAN, son of the late Prof. Henri Moissan, and assistant at the Ecole supérieure de Pharmacie at Paris, who died on the field of battle on August 10, has left to his school, in addition to the scientific estate of his father, the capital sum of 200,000 francs for the foundation of two prizes—one for chemistry (prix Moissan), and one for pharmacy (prix Lugan), in memory respectively of his father and his mother, *née* Lugan.

THE Royal Astronomical Society has taken the first step towards placing itself in line with a number of other scientific societies by deciding at the anniversary meeting on Friday last, February 12, "That this meeting approves of the admission of women as Fellows and Associates of the Society, and requests that all steps necessary may be taken to make their election possible." The meeting was almost unanimously in favour of the proposal—fifty-nine fellows voting for it to three against—and a supplementary charter will now be applied for in order to put the resolution into force.

AT its annual meeting, held in Saint Louis on December 28 last, the Federation of American Societies for Experimental Biology—which includes the Physiological Society, the Society of Biological Chemists, the Society for Pharmacology and Experimental Therapeutics, and the Society for Experimental Pathology—passed the following resolution addressed to the men of science belonging to the nations of Europe now at war:—"That we extend to the scientific men within these nations the hope of an early and enduring peace, which will leave the nations with no permanent cause of rancour towards each other, and which will ensure to each the glories of scientific and humanitarian achievement in accordance with its own conception of these ideals."

THE council of the Royal College of Surgeons has given permission to the Royal Anthropological Institute and Prehistoric Society of East Anglia to hold a combined meeting in the museum and theatre of the college, Lincoln's Inn Fields, W.C., on the afternoon of February 23. Many recently discovered specimens will be shown and discussed, proceedings commencing at 2.30. An evening meeting will be held on the same day in the rooms of the Royal Anthropological Institute at 50 Great Russell Street, W.C., at 8.15, when Mr. Charles Dawson will give a descriptive and illustrated account of the various cultures found in the deposits of the valley of the Sussex Ouse—particularly of the implements recently discovered at Piltdown. Mr. Dawson will also bring forward new evidence bearing on the origin of eoliths, and will exhibit Catalonian silk amulets in the form of prehistoric weapons.

UNDER the auspices of the London Manx Society a meeting was held in the Geological Society's Rooms, Burlington House, on February 13, to celebrate the centenary of the birth of the distinguished naturalist, Edward Forbes. He was born at Douglas, in the Isle of Man, on February 12, 1815, and died at Edinburgh, where he held the University chair of natural history, on November 18, 1854. The president of the Geological Society (Dr. A. Smith Woodward) presided, and addresses were given by Sir Archibald Geikie and Prof. Edward Hull, who had personal memories of Forbes. Sir Archibald Geikie suggested that an Isle of Man Museum might be regarded as a most appropriate memorial of Forbes in the island of his birth, and could be made to include illustrations both of the natural history and of the antiquities of the country. Mr. A. P. Graves added that the associations of Manx literature might also find a place in such an institution. After the meeting the members of the London Manx Society visited the Museum of Practical Geology, Jermyn Street, where Forbes worked for many years as naturalist to the Geological Survey. In the evening, a second meeting and conversazione were held in the St. Bride's Institute.

SEVERAL correspondents have sent us descriptions and sketches of a sun-pillar capped with an arc of a secondary halo, observed during the afternoon of February 11. Writing from Stonyhurst College Observatory, Mr. W. McKeon states that at oh. 30m. p.m. the ordinary halo of 22° radius was observed, capped by a bright "arc of upper contact," which not only accompanied the halo throughout the whole afternoon, but outlived it by quite thirty minutes. "At 3.15 p.m. a hazy beam of white light began to project upwards from the sun. This gradually brightened and lengthened until by 4.30 it reached the bright arc of contact 22° N. By this time the halo proper was quite faint, while the 'solar pillar' supporting, as it were, the arc of contact, was very bright, and stood out most conspicuously. Just before 5 p.m. the 22° halo had quite vanished, at which time the 'arc' and 'pillar' changed to a strong pink, and continued thus, without the halo, as a most striking object until 5.25 p.m., when both together suddenly faded away." The origins and characteristics of these and related optical phenomena in the atmosphere were discussed in articles in NATURE of June 13, 1912, and April 3, 1913.

"ALDERMAN ARCHIBALD said he did not think the principle was right; it was really a political question." We quote from a report of a meeting of the Middlesbrough Education Committee, at which a circular letter was read from the British Science Guild, asking if a general undertaking would be given to purchase British glass for school laboratory purposes for a period of three years after the war. Seventy per cent. of the public schools represented on the Headmasters' Conference are willing to afford this support to manufacturers contemplating expenditure upon plant for the production of the glassware hitherto obtained mostly from Germany and Austria, but Alderman Archibald suspects that the effort being made to encourage the establishment of these factories is a political move in which the Middlesbrough Education Committee would be unwise to take part. We have fortunately been relieved of the disputes of party politics for the past six months, but apparently the guardians of education at Middlesbrough think that a body like the British Science Guild has been got at by political propagandists, and is trying to forestall legislation of some kind; for the Committee decided without discussion to take no action for the present. Meanwhile the supplies of glassware for laboratories are getting low, and, following Alderman Archibald, nothing must be done to stimulate enterprise in its manufacture here because the attempt to meet an educational want is "really a political question." That an education authority should commit itself to such a view is a pitiful sign of local inability to understand national needs.

THAT the protective treatment against typhoid fever is indeed protective, we all are agreed. Not one man in a hundred thousand disbelieves this plain fact; the only question is whether the treatment ought to be made compulsory. Soldiers take non-compulsion as evidence that the authorities are not sure of the great value of the treatment. "If you believed in it, really believed in it, of course you would make it compulsory." That is the argument; and a very sound argument it is. We may be sure that compulsion would meet with no serious opposition among the men themselves, and would make no appreciable difference to recruiting. Of course, clear instructions ought to be given to all men how to take care of themselves after the treatment. For two days, a man ought to keep quiet; he ought to avoid exposure to the risk of pneumonia; and he ought to leave off all alcohol. If a man, for two days after each of his two doses, will keep quiet, and keep warm, and keep teetotal, he may be absolutely certain that he will have very little trouble from the treatment. All experience, ever since the South African war, has gone to emphasise the danger of direct infection from the surface-soil. It is man who infects men. When the hot weather comes he will have the assistance of swarms of flies; there will be not less typhoid but more. Happily, vast numbers of our troops are already protected; and the "conscientious objector" is likely to feel the "pressure" of his own comrades in the ranks. If the Government adopts some measure of compulsion, it will be a very popular action. It would bring the Government gratitude and censure in the proportion of the sack to the bread in Falstaff's tavern-bill.

THE gold medal of the Royal Astronomical Society was presented, at the meeting of the society on February 12, to Prof. A. Fowler in recognition of his spectroscopic investigations of sun-spots, stars, and comets, and related laboratory researches. In a short survey of Prof. Fowler's work, the president, Major E. H. Hills, referred to his association with, and extension of, the study under laboratory conditions, initiated by Sir Norman Lockyer, of various elements represented in celestial spectra. By these means he discovered that many of the band lines peculiar to the sun-spot spectrum are due to magnesium hydride, the existence of which, together with flutings of titanium oxide and calcium hydride, indicate that spots are regions of reduced temperature. This view was further supported by the observation that the "long" lines of the higher chromosphere are generally weakened in sun-spot spectra, while the "short" lines of the lower chromosphere are generally widened or strengthened. The arc spectrum of scandium was shown to consist of two distinct sets of lines which similarly present a differential behaviour in the spectra of the sun, sun-spots, and chromosphere. In the field of stellar spectra, Prof. Fowler proved that the chief substance concerned in the production of the flutings characteristic of stars of the Antarian type is titanium oxide. The tail spectrum of comets was identified by him with the spectrum of carbon monoxide at extremely low pressures—0·01 mm. or less; and during this research a new high-pressure (100 mm.) spectrum of the same carbon compound was discovered. Investigations of spark spectra, and particularly of Sir Norman Lockyer's class of "enhanced lines," led to the discovery of a new ultra-violet series ascribed to "proto-helium," and also to a series of close doublets having the spark-line of magnesium, λ 4481, as its leader. The bearing of these series upon theories of the constitution of the atom was discussed in the Bakerian Lecture delivered by Prof. Fowler before the Royal Society last year (NATURE, April 9, 1914, vol. xciii, p. 145).

PROF. CARL THEODOR LIEBERMANN, who died on December 28 of last year, at the age of seventy-two, left behind, in his numerous published researches, the record of a remarkably active scientific career. Carl Liebermann was born in Berlin in 1842, and spent the greater part of his life in his native town, first as assistant to Prof. v. Baeyer, and later as professor of chemistry in the Technical College of Charlottenburg, It was in Baeyer's laboratory in 1868 that young Liebermann, with his colleague, Carl Graebe, made the famous discovery of the synthesis of alizarin from anthracene, which, like modern synthetic indigo, revolutionised the colour industry of the time, and brought to a sudden end the cultivation of the natural product. It would be impossible in the course of a short notice to attempt to enumerate the variety of problems in organic chemistry to which Liebermann devoted his long life. Following up his first investigation, he made a comprehensive study of the various hydroxy-derivatives of anthraquinone and the corresponding derivatives of naphthalene (naphthazarin), from which he was led to formulate a theory of coloured compounds and mordants. He included in his researches the study of many natural and artificial dyestuffs, such as brasilin, rhamnetin, quercetin, chrysarobin, cochineal, coeruligrone, and a variety of phenol colouring matters, the structure of which he was able in many cases to ascertain. In later years he turned his attention to the alkaloids, especially the numerous constituents of the coca-leaf, which he isolated and studied. Among these constituents he examined cocaine, for which he devised a method of synthesis, cinnamylcocaine, the truxillines, which he also synthesised, and also ascertained the structure of the interesting pair of truxillic acids with which they are combined; benzoylecgonine; tropa-cocaine and hygrine. The latter he also found in Peruvian cusco-leaves, together with cuscohygrine. Prof. Liebermann received the honorary degree of D.Sc. of the University of Leeds in 1906, and was also an honorary fellow of the Chemical Society.

WHEN Columbus discovered and landed on Jamaica during his second voyage, in 1494, he found it populated by Arawak Indians, who, after some hesitation, followed by bribing, received the white men in a friendly spirit. The subsequent settlement of the island by the Spaniards, and the impressment of the natives for work in the gold-mines of Haiti, as well as for agricultural labour in their own island, soon led, however, to their extermination, and by 1558 the whole Arawak nation appears to have been completely wiped out. To recover traces and relics of this lost race has been the self-imposed task of Mr. G. C. Longley, of Pelham Manor, New York, who for the last half-dozen years has passed the winter in the island exploring the old kitchen-middens. The result is a collection of some 1500 celts, fragments of pottery, grinding-stones, stone-pendants, etc., all of which have been presented by the collector to the American Museum of Natural History. They form the subject of an illustrated article by Mr. Longley in the *American Museum Journal* for December, 1914.

A NOVEL kind of nesting-box made of bark in the shape of a slug, so as to be almost invisible when affixed to the trunk or arm of a tree, is described and illustrated in the *Selborne Magazine* for February.

A WELL-MERITED protest against the treatment of horses with the home troops in the early part of their training in certain districts is formulated in the February issue of the *Animals' Friend*, where it is stated that horses taken out of good stables were tethered in the open during wet and cold weather—in some cases even without rugs. Many fine horses, as we can testify from personal knowledge, were utterly ruined, if not actually killed, by such treatment.

IN his annual fish-notes from Great Yarmouth, for 1914, Mr. A. H. Patterson, in the January number of the *Zoologist*, expresses the opinion that the fecundity of the herring is so great as to render it impossible for sea-birds, such as gannets and cormorants, even to reduce, let alone deplete, the shoals that annually visit our coasts. The reduction in the numbers of cetaceans in recent years must also be taken into account, as well as the increasing capture of dog-fishes for food. Nothing can ever exhaust the shoals save the trawl-net, which in a few hours can destroy, in the shape of ova on the sea-bed, millions more potential herrings than those devoured in the adult state by birds in a twelvemonth.

THE most striking photographs in the January number of *Wild Life* are those of the head of a Guinea baboon and of a magnificent cluster of eggs of the large yellow underwing moth. In some instances a moth of that species will lay no fewer than two thousand of these beautifully sculptured eggs. which are at first white, but change to purple before hatching. Another good sample of photography is a badger just peering out from its "sett" beneath the trunk of a giant oak. The writer of the accompanying letterpress, or at all events the editor, should, however, have known that it is quite out of date to refer to the badger as *"Ursus" meles.* Indeed, the practice of introducing the scientific names of well-known animals in publications of this nature is altogether unnecessary.

THE Imperial Department of Agriculture for the West Indies has issued a useful pamphlet (No. 76) dealing with Indian corn (maize). The cultivation, husking, milling, etc., are described in detail, and the insect pests are fully treated with the aid of illustrations. Of these the corn-ear "worm," *Laphygma frugiperda,* is the most serious.

INDIAN Forest Bulletin, No. 26, gives an account of the resin industry in Kumaon, the preliminary experiments for which were carried out by Dehra Dun officers twenty-five years ago. The oleo-resin from the Chír pine (*Pinus longifolia*) is now successfully obtained by methods similar to those in use in the Landes district of France, and 43,000 maunds of crude resin were yielded in 1913-14.

THE buildings of the Forest Research Institute at Dehra Dun are described and illustrated in the December number of the *Indian Forester.* The buildings just completed consist of a main research institute in which the fine library is housed, a chemical laboratory with a separate distillery and separate gas-house, workshops for the economist and entomologist, an insectary, and a students' laboratory. The buildings are in red brick, uniform in style but unfortunately very far from beautiful.

THE Potamogetons of the Philippine Islands have been examined by Mr. A. W. Bennett, and his account appears in the same number of the *Philippine Journal of Science.* Only one new species is described. The almost world-wide range of some of the species of these aquatic plants is of interest, *P. angustifolius,* for instance, being found in Europe, North America, Cuba, Madagascar, India, China, and Luzon. *P. pusillus* is equally widespread. *P. javanicus* appears to be the only species found in the Philippines which extends to Australia.

IN 1901, amongst 2000 seedlings that were raised from the nuts of a certain black walnut (*Juglans Californica*) tree, growing at Santa Ana, in California, there were found twenty plants with peculiar foliage. The parent tree, which was normal, had large compound leaves, each composed of eleven to nineteen leaflets. The peculiar seedlings bore small leaves, each made up of three leaflets, or in rare cases reduced to a single leaflet. Mr. N. B. Pierce, of Santa Ana, writing in NATURE, September 10, 1914, p. 34, considered this sport to be a hybrid between the Californian walnut and the evergreen oak, *Quercus agrifolia,* which grows in the same region; and the occurrence of a supposed bigeneric cross created a sensation in California. The sport, while interesting, seems merely to be a case of arrested development, exactly similar to that of the simple-leaf ash well known in Europe, and figured in NATURE, January 7, 1915, p. 522. Prof. Babcock, of Berkeley University, has made an elaborate study of this sport, publishing the results in two profusely illustrated bulletins ("Studies in Juglans," i. and ii., Univ. of California, Pub. in Agri. Sciences, vol. ii., 1913, 1914), and comes to the conclusion that there is no evidence of hybridisation, and that the sport does not arise from visibly malformed flowers or fruits. He states that a normal tree has been found which annually produces a small percentage of the trifoliolate form. This is exactly the case with the simple-leaf ash, and the real cause of the arrested development which is present is as yet unexplained.

THE Monthly Meteorological Charts of the Atlantic and Indian Oceans for February, 1915, which have recently been issued by the Meteorological Office, give much detail of interest to the seaman, such as winds, currents, barometric pressure, temperature, and ice. The Atlantic chart mentions that the frequency of fog in February is similar to that recorded since October, and the maximum frequency in mid-Atlantic seldom exceeds 5 per cent., as against 40 per cent. in July. Steamers making the Transatlantic passage in February are not likely to be hindered by fog. Thick weather is, however, commonly experienced from December to February near the African land, due largely to dust blown seaward from the Sahara. Charts of mean salinity and surface temperature are given for the Atlantic and for the English Channel for October, 1914. The isohalines coupled with the sea surface isotherms will be of considerable scientific value with the extension of the period. The Indian Ocean chart has a copious note on submarine seismic disturbances. It mentions that some years ago the late Sir G. H. Darwin, member of the Meteorological Council, pointed out that probably the actual places of origin of earthquake shocks are usually situated under the sea in proximity to a coast. Numerous extracts are given from special meteorological logs kept on board ship, and in these the sensation is commonly described as though the vessel was grinding over a rocky bottom or reef.

IN his address to the physics section of the American Association for the Advancement of Science in

December last the chairman, Prof. A. D. Cole, of the Ohio State University, after reviewing the evidence for the existence of the electronic atom with a central nucleus, expressed the opinion that some such form of atom would soon receive general recognition. He does not, however, think that the details of any of the atomic models at present under discussion can be considered as more than tentative and provisional. The address is reproduced in *Science* for January 15, and gives a clear and readable account of the advances made during the past three years.

THE *résumé* of communications made to the French Physical Society at the meeting on January 15 includes a short account of the automatic apparatus devised by M. E. L. Dupuy for the study of the anomalies in the expansion of alloys with rise of temperature. The nature of these anomalies makes it desirable that a continuous record of the expansion should be obtained, and M. Dupuy has succeeded by means of his apparatus in obtaining records for a number of chrome-nickel steels which go far towards clearing the way for a complete explanation of their behaviour. The new apparatus requires a rod about 7 cm. long of the material to be tested, and a similar rod of silica. The two support a mirror which rotates about a horizontal axis as the lengths of the two rods become different during the expansion. A beam of light after reflection at this mirror falls on a second, which is rotated about a vertical axis as the current from a thermo-junction in contact with the specimen varies. The beam of light is received finally on a photographic plate, and a curve results the abscissæ of which are temperatures and ordinates expansions.

IN a paper entitled "Alchemy and the Devil," by Dr. J. B. Craven, Archdeacon of Orkney, read before the Alchemical Society on February 12, attention was directed to the close association which existed in the eyes both of the Church and the people between alchemy and magic, and the stern disapprobation with which such arts were viewed, as aiming at gaining the pleasures of wealth and the senses by demoniacal aid. The State joined in this denunciation, and in 1404 the practice of alchemy was made a felony in England. In 1689, however, this Act was repealed, doubtless owing to the saner and more scientific attitude towards nature and the investigation of her secrets then coming to the fore, and culminating in the foundation of the Royal Society. Whilst, in fact, alchemy and magical practices had little in common, many seekers after the Philosopher's Stone were inspired by evil motives—by greed and avarice. But others were true natural philosophers, and there was, Archdeacon Craven suggested, a still higher alchemy, which aimed, not at making material gold, but at the transmutation of the soul's dross into spiritual gold.

ATTENTION may be directed to a paper in which Mr. W. N. Haworth describes a "New Method of Alkylating Sugars" (Trans. Chem. Soc., 1915, vol. cvii., p. 8). This operation has been carried out previously by means of alkyl iodides and silver oxide, two expensive agents which have the advantage of avoiding complications, such as racemisation, the Walden inversion, and the interconversion of glucosides. It is now shown that similar results can be achieved in aqueous solutions and at about one-fifth of the cost by using alkyl sulphates and caustic soda as alkylating agents. In every case where comparison was possible, the optical rotatory power of the product was equal to that obtained by the earlier methods, and it is clear that the easier and cheaper preparation will greatly facilitate synthetic experiments in the sugar series.

THE January issue of the Chemical Society's Journal contains a redetermination of the atomic weight of tin by Mr. H. V. A. Briscoe, working in Prof. Baker's laboratory at South Kensington. It is remarkable that nearly all the previous determinations gave values approximating to 118, with the exception of five series of measurements by Bongartz and Classen, which gave the value 119·0, which has been generally used ever since. Nearly all the early measurements depended on the oxidation of tin to the dioxide or the converse reduction, but it is doubtful whether this oxide is a suitable substance for experiments on atomic weight. On the other hand, all the five methods of Bongartz and Classen depended on weighing tin in the form of an electrolytic deposit on platinum, and would be vitiated by the inclusion of mother-liquor in the deposit. The new measurements now described depend on finding the ratio, $SnCl_4 : Ag$. Fifteen analyses gave numbers ranging from 118·678 to 118·714, and eleven of these fell between 118·690 and 118·711. The atomic weight finally deduced is 118·70, and seems to be worthy of considerable confidence.

THE well-deserved popularity of the two-cycle hot-bulb, or semi-Diesel engine, is directing the attention of designers toward the perfecting of this simple type of prime-mover. Earlier examples of this type were rather uneconomical compared with the four-cycle engine, but this objection has been gradually reduced. In ease of starting, trustworthiness, etc., the hot-bulb semi-Diesel engine has undoubted advantages over some other forms. *Engineering* for February 12 has illustrated descriptions of an engine of this type made by Martin's Cultivator Company, Ltd., of Stamford. The engine illustrated gives 9 brake-horse-power at 475 revolutions per minute, and has a single cylinder 7 in. diameter by 8 in. stroke. Scavenging air is compressed in the crank-case. The engine is started by a blow-lamp, and will start in about three minutes from cold on crude oil, and in five minutes on paraffin. Regulating and governing are effected by varying the stroke of the fuel-pump. There are many points in the design of this engine which should make for trustworthiness in working and freedom from breakdown.

THE *Engineer* for February 12 contains an illustrated description of the construction of the new Mappin terraces at the Zoological Gardens in Regent's Park. The area covered by the terraces and hills takes the shape of a quadrant, and measures about

10,000 square yards. The hills are about 70 ft. high, and have an area of about 39,000 square feet; these are made in reinforced concrete about 3 in. thick. The lower terraces where the heavier animals are quartered have thicknesses varying from 5 to 7 in. No two square yards of surface are alike. The entire area was divided into squares of approximately 7 ft. side by radial and concentric lines. Contours along each of these lines were drawn, and these, together with a plaster model, enabled the scaffolding and centering to be erected. Timber being out of the question for the centering on account of the irregularity of the surface, a simple and effective substitute was found in wire netting having a fairly small mesh. By mixing the concrete fairly dry, very little escaped through the meshes. The whole is supported on reinforced concrete columns; very wide and shallow beams span the columns in both directions, and are embodied in the thickness of the slabs which form the surface of the terraces and hills. The work was completed in thirteen months.

MESSRS. JOHN BARTHOLOMEW AND CO., of the Geographical Institute, Edinburgh, have published a new and revised edition of their "Route Chart of the World," which is sold at 1*s.* on paper, and 1*s.* 6*d* on cloth.

THE Proceedings of the third International Congress of Tropical Agriculture, held at the Imperial Institute at the end of June last, have been published by Messrs. John Bale, Sons and Danielsson, Ltd., in one volume, at the price of 10*s.* net. An article describing the meetings of the congress was published in the issue of NATURE for July 9, 1914 (vol. xciii., p. 489). The volume has been edited by the honorary secretaries of the congress. It runs to 407 pages, and includes abstracts of the papers supplied by the authors, reports of the discussions, and the address of the president, Prof. W. R. Dunstan. More than 150 papers, coming from authorities in fifty different countries, were presented to the congress, and the principal problems connected with tropical agriculture were dealt with.

AMONG the forthcoming books of the *Oxford University Press* are the following:—In *Anthropology*:—Aboriginal Siberia · a Study in Social Anthropology, M. A. Czaplicka, illustrated; Contributions to the Ethnology of the Salish Tribes, J. A. Teit; Lower Umpqua Texts, L. J. Frachtenberg. In *Biology*:—Heredity and Environment, E. G. Conklin. In *Geography*:— Historical Geography of South Africa, Sir C. Lucas, part ii., from 1895 to the Present Day; Geography of Eastern Asia, D. Paton; The Voyages of the Norsemen to America, W. Hovgaard (Scandinavian Monographs, vol. i.). In *Medical Science*:—The Evolution of Modern Medicine, Sir W. Osler. In *Miscellaneous* publications:—Scientific Management, C. B. Thompson; Architectural Acoustics, W. C. Sabine.—The *Cambridge University Press* announces for early publication the following volumes in the "University of Chicago Science Series":—The Origin of the Earth, Prof. T. C. Chamberlin; The Isolation and Measurement of the Electron, Prof. R. A. Millikan; Finite Collineation Groups, Prof. H. F. Blichfeldt.—*Henry Holt and Co.* (*New York*) announce:—The Functions of the Nervous System and the Special Senses, R. P. Angier; General Zoology, Prof. E. G. Conklin; Economic Zoology and Entomology, Prof. V. L. Kellogg and R. W. Doane; Industrial and Commercial Geography for High Schools, Prof. J. R. Smith: College Text-book of Botany, Prof. D. S. Johnson.

OUR ASTRONOMICAL COLUMN.

A NEW COMET, 1915*a* (MELLISH).—A telegram from Prof. Strömgren, Copenhagen, received at the Royal Astronomical Society on February 12, announces the discovery of a small bright comet by Mr. J. E. Mellish, of Madison, Wisconsin, U.S.A., in the position R.A. 17h., declination 3° N., and moving slowly east. A further telegram received on February 16 announces that on February 14 the position was R.A. 17h. 7m., declination 2° 54′ N. The comet is thus in Ophiuchus, and rises about 2 a.m., so that it should be visible in a small telescope between that hour and daybreak.

THE ZODIACAL LIGHT.—Those who are in a position to make observations of the zodiacal light will find some very useful information in the notes on this subject published in the U.S. *Monthly Weather Review* (September, 1914), by Mr. Maxwell Hall. The author describes the chief points which should receive the observer's careful attention, and suggests the best seasons for studying the eastern and western branches. Naturally, low latitudes are best suited for the observation; the fact that no instruments are required, but simply a level terrace and wide expanse of sky should multiply the number of those who observe this interesting and beautiful phenomenon.

ASTRONOMY AND MATHEMATICS.—In an address as vice-president and chairman of Section A (Astronomy and Mathematics) of the American Association for the Advancement of Science, Dr. Frank Schlesinger took as his subject the object of astronomical and mathematical research (*Science,* January 22). The address takes the form of pointing out to the astronomer and mathematician the great need of mutual help, and the tendency of meetings of mathematical and astronomical societies to increase the separation between these two sciences. Dr. Schlesinger directs attention to numerous astronomical problems in the solution of which the help of the mathematician is needed, and takes as an example that which concerns spectroscopic binaries, which offers a rich field.

THE MADRID OBSERVATORY'S ANNUAL FOR 1915.—The Annual for 1915 issued by the Madrid Observatory under the editorship of Prof. Iniguez, is a volume of 703 pages. The first two hundred pages are devoted to tabular statements regarding the ephemerides of the sun and moon, followed by those of planets, satellites, and comets, and facts dealing with eclipses and occultations, together with some numerous useful tables. These are followed by several articles by different authors, among which may be mentioned a long article on time determination, and a preliminary account of the solar eclipse expedition of August last. A *résumé* of the observations of the sun made at the Madrid Observatory during 1913, including spots, faculæ, prominences, etc., is given, concluding with the meteorological observations made during the same year.

WHAT IS GRAVITATION?—"It is scarcely too much to say that the nature of gravitation remains as much